USDA Forest Service
U.S. DEPARTMENT OF AGRICULTURE

Eastern Region State, Private, and Tribal Forestry | R9–PR–001–23 | July 2023

Pest Alert

Bacterial Leaf Scorch of Oak

Bacterial leaf scorch (BLS), a common systemic disease, affects multiple woody species in North America. In oaks (*Quercus* spp.), the Gram-negative bacterium *Xylella fastidiosa* subsp. *multiplex* causes the disease. BLS is more severe in red oak group members than white oak group members. The disease causes chronic damage to trees over a period of years that eventually leads to tree death. Increased incidence of BLS on oaks in recent years may be contributing to oak decline.

Sharpshooter leafhoppers and other xylem-sap feeding insects (e.g., cicadas and spittlebugs) transmit BLS to nearby healthy trees. Long-distance spread occurs when humans move infected plant materials.

Figure 1.—Scorch appearance associated with BLS. Courtesy photo by William Seybold, Delaware Department of Agriculture.

Figure 2.—Whole branches show the scorch appearance associated with BLS. Courtesy photo by William Seybold, Delaware Department of Agriculture.

Identification and Description

BLS infects the vascular system of the tree and restricts water transportation by clogging vessels within the xylem—leading to leaf scorch, branch dieback, and host mortality. Symptoms of BLS appear in mid-summer and continue until fall. Leaf drying and scorch begin along leaf margins and progress toward the midrib and petiole. BLS affected oak leaves show a distinct transition zone between the margin of dead leaf tissue and healthy tissue. This intermediate transition zone appears dull, pale green in color, and has a “water-soaked” appearance (Figure 1). Heavy damage to leaves often leads to branch dieback (Figure 2). Drought exacerbates symptom development. In an individual tree, symptoms typically progress over a period of years, starting in a portion of the branches, recurring on these previously infected branches in subsequent years, and then progressing throughout the canopy.

In the laboratory, molecular tools such as polymerase chain reaction (PCR) most accurately detect BLS, while the enzyme-linked immunosorbent assay (ELISA) is a useful screening technique.

Current Range

Xylella fastidiosa subsp. *multiplex* is thought to be native to North America, whereas other subspecies that infect different hosts were introduced (e.g., *X. fastidiosa* subsp. *fastidiosa* causing Pierce's disease of grapevines). There is high variation within *X. fastidiosa* subsp. *multiplex*, with several strains or types causing disease on different hosts. The oak type causes disease on oak, elm, sycamore, and sweetgum, predominantly in the Southern United States, though lately more northern locations are reporting BLS, particularly on oaks. Widespread in urban areas, the disease was also recently found in forested landscapes. Figure 3 shows the current reporting of laboratory verified BLS detections on oaks.

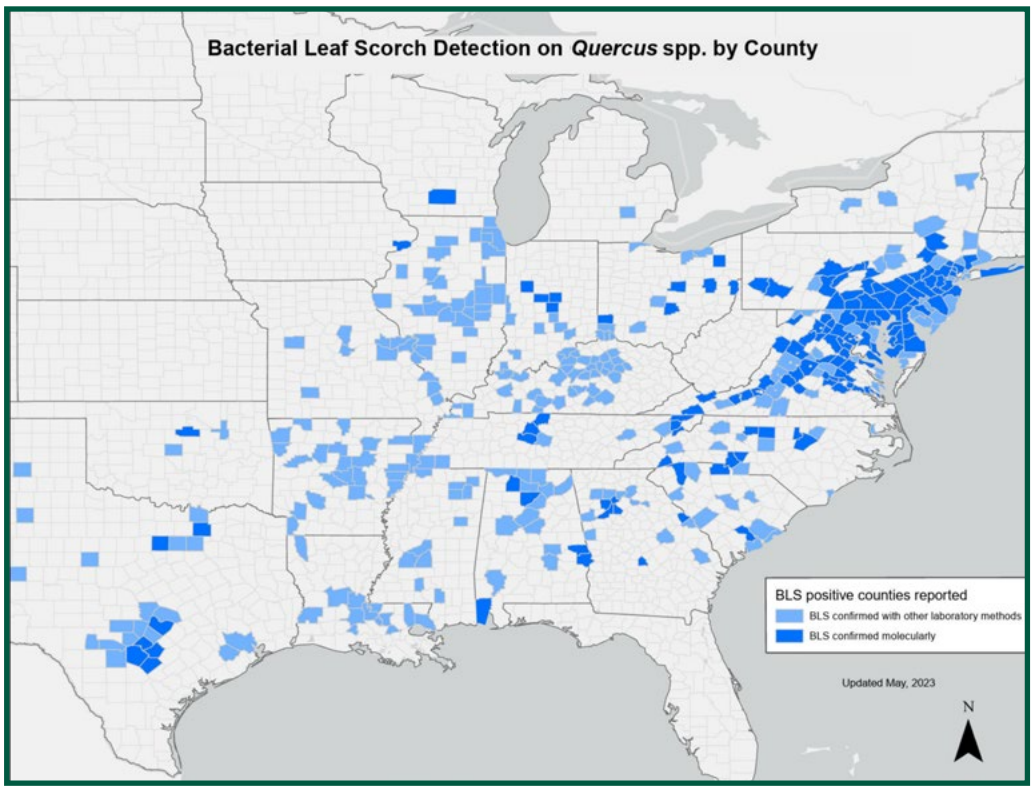
Bacterial Leaf Scorch Detection on *Quercus* spp. by County
BLS positive counties reported
BLS confirmed with other laboratory methods
BLS confirmed molecularly
Updated May, 2023
N

Figure 3.—The range of BLS on oaks (*Quercus* spp.) across Eastern, Southern, and Midwestern States. USDA Forest Service map consolidates data from communication with state forest health specialists and testing laboratories, and the National Plant Diagnostic Network (NPDN) National Data Repository, and the USDA National Institute of Food and Agriculture (NIFA) Research, Education and Economics Information System (REEIS) [search: Bacterial Leaf Scorch – *Xylella fastidiosa* (2023)].

Management

There is no cure for BLS; management options can only extend the life of a tree. In urban environments, managing BLS should focus on monitoring tree health; maintaining vigor; and removing and disposing infected tree material, especially when it poses a hazard. Applying growth regulators such as paclobutrazol as a basal soil drench can reduce shoot growth and increase drought tolerance. Measures that may benefit tree health include mulching, reducing soil compaction, and fertilizing. Therapeutic pruning removes infected material as symptoms develop. Another therapeutic treatment is commercial application of oxytetracycline, an antibiotic, to mildly infected, high-value trees. Oxytetracycline does not cure infections but can reduce symptoms with multiple applications. Efforts to control insect vectors are costly and generally unsuccessful, as there are many potential vectors, and success depends on knowing the specific vector and its life stages.

Be on the Lookout

Please contact your local forest health specialist with questions about identifying or managing BLS.

Prepared by:

Danielle K. Martin
Forest Pathologist, USDA Forest Service
Eastern Region: State, Private, and Tribal Forestry
Morgantown, WV 26505

Kristen Wickert
Forest Pathologist, USDA Forest Service
Eastern Region: State, Private, and Tribal Forestry
Morgantown, WV 26505

Linda Haugen
Forest Pathologist, USDA Forest Service
Eastern Region: State, Private, and Tribal Forestry
St. Paul, MN 55108

Eastern Region
State, Private, and Tribal Forestry
626 E. Wisconsin Ave.
Milwaukee, WI 53202
https://www.fs.usda.gov/r9

USDA is an equal opportunity provider, employer, and lender.